CLAIMS

1. (Currently Amended) A ~~switching~~ device for switching between two states ~~such as 1 or 0~~ in computing or on off states ~~[[.]]~~ ~~Wwherein the switched state depends on the particle wave function size in space andwherein the wave function size depends on the particle total energy and the switching between the device two states is done by changing the particle total energy~~ compromising:

(a) said switch state is determined by electric field or electric force caused by ~~said~~ particle electric charge distribution in space or particle occupancy distribution in space denoted as wave function size in space.

(b) said wave function size depends on the particle energy and the switching between said device two states is done by changing the particle energy.

2. (Original) The device of claim 1 wherein one states is indicated by a certain particle wave function size in space and other state is indicated by a bigger particle wave function size in space.

3. (Cancelled)

4. (Cancelled)

5. (Previously presented) A switching device as in claim 1 wherein the wave function size depends on the particle total energy. The switching between the device two states is done by changing the particle total energy.

6. (Currently Amended) The device of ~~A switching device as in~~ claim 1 wherein ~~the~~ said wave function size depends on ~~the~~ said particle kinetic energy and the ~~. The~~ switching between the device two states is done by changing the particle kinetic energy.

7. (Currently Amended) The device of ~~A switching device as in~~ claim 1 wherein the switching between the device two states is done by changing the particle potential energy. For example electric energy or magnetic energy.

8(Currently Amended) ~~The A switching device as in device of claim 1 wherein representing the device switching statethe switching between the two states is achieved by transmitting energy to or from an additional particle and the particle represented~~ A device for switching between two states in computing or on off states said switch state determined by said particle electric charge distribution in space or particle occupancy distribution in space denoted as wave function size in space.
compr~~om~~ising:

(a) said particle switched between two states by energy receipt from additional particle to said particle.

(b) said particle revert switched state by energy transmitted from said particle to other particle

9. (Cancelled)

10. (Currently amended) ~~The device of A switching device as in claim 1 wherein the switching between the two states is achieved by photon or absorbsion~~ absorption or emission by the switched particle

A device for switching between two states in computing or on off states said switch state determined by said particle electric charge distribution in space or particle occupancy distribution in space denoted as wave function size in space.

compr~~om~~ising:

(a) said particle switched between two states by said particle photon absorption.

(b) revert switching between said two state achieved by said particle photon emission.

11-12. (Cancelled)

13. (Currently amended) ~~(Original) The device of claim 1~~ A device for switching between two states in computing or on off states said switch state determined by said particle electric charge distribution in space or particle occupancy distribution in space denoted as wave function size in space. wherein the switching between two states is achieved by phonon or phonons energy exchange with the switched particle.

14-15. (cancelled)

16. (Currently Amended) The device of ~~A switching device as in~~ claim 1 ~~comprising two boundaries in~~ on two sides ~~of the switching particle~~ in the ~~second state~~[[.]], ~~W~~wherein ~~the two switching states is~~ are ~~detected by the corresponding values of the potential between the two boundaries.~~ comprising:

(a) a container contained particle wave function

(b) two charged zones on two sides of said container wherein said switched particle wave function is detected by corresponded values of the potential between said two charged zones.

17-18. (Cancelled)

19. (Currently Amended) ~~The [[A]] switching device as in of claim 1~~[[.]] A device for switching between two states in computing or on off states said switch state determined by said particle electric charge distribution in space or particle occupancy distribution in space denoted as wave function size in space.wherein ~~the two switching~~ said two switched particle states ~~is~~ are detected by photon detection,photon scattering, photon absorption or photon transmission.

20. (Canceled).

21. (Currently Amended) The device of ~~A switching device for switching between two states such as 1 or 0 in computing or on off states.Wherein the switched state depends on the particle wave function dynamic size change in space .W according to~~ claim 1 ~~wherein the determination of the dynamics change in state includes detection of a current induced by dynamic~~

~~change of expansion of said wave function of at least one particle, is detected by a corresponding to a charge current.~~

compromising :

(a) said container of said particle wave function.

(b) said conductive element abutting said container wherein continues change of said particle wave function caused conduction on said conductive element.

22. (Currently amended) A switching device for switching between two states comprising:

(a) a two regions container.

(b) inside said container a particle is switched between two states wherein in one state the particle is in one region and in said second state said particle is on said second region wherin in near seconed region there is at least one element for detecting voltage or current change due to the present of the particle in seconed region. Wherein in this claim the particle movement is translation movement of the all the particle and not wave function expansion as in the previous claims.

(c) The particle state can be revert due to particle bounding to initial sate or due to reverting energy.

23. (currently amended) A switching device of claim 1 comprising:

(a) an electric current element.

(b) screening element close to the charge current element wherein said screening element has a limited region where electric charge in this region influenced said current element .

(c) a particle in a container that has two states, first state said particle wave function size adjusted only to said screening element . In second state said particle wave function expended to said limited region as well thereby influencing the current value in said electric current element.

(d) said switching between the two particle states is done by any of the method in claims 1, 5-8, 10, 13.

24-27. (Cancelled)

28. ~~(Formerly claim 23a)~~ (Currently amended) A switching device as in claim 1[[.]]

a. ~~comprizing~~ comprising ~~two~~ one regions or more which create a repulsive or attracted potential on a particle ~~between them~~[[.]] wherein ~~T~~the particle size is ~~depends~~ dependent on the repulsive or attracted potential value, such that by reducing the repulsive potential value or increasing attracted potential value the particle wave function size expands, thus achieving two states denoted by the particle wave function sizes[[.]] and ~~T~~to revert to the initial state the ~~repulsive~~ potential is reverted to its initial value.

(b) said switching device of section a wherein the electric potential on said charged regions could be a combination of repelled potential region and attracted potential region.

29. {Formerly claim 23b} (Cancelled)

30 (Currently amended). The device of ~~(New) A switching device as in~~ claim 1 wherein the change in said states is detected by a corresponding change in voltage of an electrode.

31.(Currently amended) - ~~A device comprising:~~
~~a container in which at least one particle is contained, wherein the particle in a first lower energy state is confined to a given region and wherein, in a second higher energy state, the particle is increased in size such that a portion of the at least one particle is outside the given region, while remaining in the container; and at least one electrode adapted to detect the presence of the portion of the at least one particle outside the region or of the transition of the at least one particle from the first to the second state.~~
The device of claim 1 compromising :

(a) a first region contained the particle wave function in the first switched state.

(b) a second region adjacent to said first region contained expended part of said particle wave function of second switched state wherein said second region could be made of different material or structure as well.

32-36 (Cancelled)

37. (original) (New) A method of switching comprising:
providing at least one particle having a wave function bound to a region;
switching at least one particle from a first lower energy state in which the wave function of said particle has a first small extent to a second higher energy state in which the wave function of the at least one particle has a second larger extent, while remaining bound to the region; and
determining the state of the at least one particle or the transition of the at least one particle from one of said states to the other.

38. (Currently amended) ~~(New)~~ A ~~method~~ device according to claims 1,31,37 wherein ~~the determination of the state includes detection of a voltage induced by the expansion of the wave function of the~~ at least one ~~particle.~~ electric charge element such as electrode is positioned such that a detectable voltage change is induced on an electrode when said switch state changes.

39. (Currently amended) ~~(New)~~ A ~~method~~ device according to claims 1,31,37 wherein ~~the determination of the state includes detection of a current induced by expansion of the wave function of the~~ at least one ~~particle.~~ electric charge element such as electrode is positioned such that a detectable current change exist in said electrode when the energy state changes.

40. (Canceled)

41. (Currently amended) ~~(Original) (New))~~ A method of switching comprising:
~~providing~~ at least one particle having a wave function bound to a region;

switching at least one particle from a first lower energy state in which the wave function of said particle has a first small extent to a second higher energy state in which the wave function of the at least one particle has a second larger extent, while remaining bound to the region; and
determining the state of the at least one particle or the transition of the at least one particle from one of said states to the other,
wherein said switching is ~~effected~~ coused by an energy exchange with another particle or a phonon or by absorption or emission of a photon.

42.(Currently amended) ~~(New)~~ The switching device of claims 31,37 or ,38 comprising:

(a) ~~said~~ A silicon layer with phosphorus dopants.

(b) ~~said undoped silicon layer~~ One or more silicon oxide insulator abutting said doped silicon layer.

~~(c) said silicon oxide insulator layer on two sides of said doped silicon layer~~.An Aluminum based metallic contact abutting ~~on~~ said silicon oxide insulator layer.

(d) A silicon layer abutting said first silicon layer on an additional area to said abutting silicon oxide insulators layers ~~said Aluminum based metallic contact on said insulator layer.~~

(e) ~~said~~ Additional two silicon oxide insulator layer abutting seconed silicon layer on additional areas to abutting area of said first silicon layer.

(f) An Aluminum current conductor ~~on~~ connected to said additional silicon oxide insulator layer by two metalic contacts whereby bias applied to

said conductor detrmines particle wave function expension from first silicon with phosporos layer to seconed silicon layer.

43. (Currently amended) ~~(New)~~) A device for switching between two states in computing or on off states ~~The device of claim 1~~ compr~~o~~mising.

(a) an n- Type silicon wafer.

(b) a thin insulator layer on said wafer.

(c) a gate on insulator layer.

(d) source and drain layers on said wafer at opposite sides of said gate.

(e) one or more ~~two~~ insulator layers on gate.

(f) metal contacts on said gate insulator layers and on said source and drain.

44. (New) The device of claim 43 wherein:

(a) said silicon wafer dopants are phosphorus atoms.

(b) said insulator layers is made of silicon oxide

(c) said gate is made of phosphorus dopants.

(d) said source and drain dopants are boron atoms.

(e) said metal contacts are made of Aluminum.

45. (Currently amended) ~~(New)~~ A ~~gate~~ device compr~~o~~mising:

(a) semiconductor layer with dopants or insulator layer.

(b) insulator regions abutting to ~~on~~ layer (a) .

(c) charged region on one region or more on said insulator region thereby caused polarization inside the gate thereby gaiting is achieved.

46.. (Currently amended) ~~(New) The device of claim 1~~ A device for switching between two states in computing or on off states compr~~o~~mising:

(a) an n- Type silicon wafer.

(b) a thin insulator layer on said wafer.

(c) a gate on insulator layer.

(d) two insulator layers on gate.

(e) two charged regions adjacent to said gate insulators that create an electric repulsive potential on particles wave functions inside the gate, determined said wave function size and switched state .

(f) source and drain layers on said wafer at opposite sides of said gate.

(g) metal contacts on said source and drain.

47. (Currently amended) (New) The device of claim ~~45~~ 46 wherein:

(a) said silicon wafer dopants are phosphorus atoms.

(b) said insulator layers are made of silicon oxide

(c) said gate dopnats are ~~is made of~~ phosphorus atoms ~~dopants~~.

(d) said source and drain dopants are boron atoms.

(e) said metal contacts are made of Aluminum.

48.. (Currently amended) {Formerly claim 24} A switching device as in claim 1- ~~23~~ 46 wherein the term particle refers to one or more than one electrons neutrons or protons, photons, atoms, or molecules. ~~That have a referred function as the referred particle in claim 1-23.~~ That have a referred function as the referred particle in claim 1-46.

Device in Figure 12 contained two adjacent regions **40,41**, particle wave function is denoted by diagonal stripes and detector 43.

The operation of device is heuristically suggested in fig 12: first switched state is denoted by a particle wave function in a single region in container 41, second switched state in figure 12b is denoted by an expanded particle wave function located in region 40 and 41. The detection method **43** is for example any of the method described in previous . The methods for change the particle energy can be any of the method described in the present patent.

Following embodiment describe in more details the devices construction in the present invention.

Figure. 13 Related to the first and fourth embodiments. Particle wave function can be in one region or expended to a second region too as suggested in first embodiment, the switched state are detected by an electric conductor as suggested in the fourth embodiment. Switching device denoted 50 is schematically described in fig 13. Device 50 include layer 52 of silicon with phosphorous dopants concentration of 10 sup 17 centimeters sup -3, undoped Si layer 54, silicon oxide insulators layers 56,58~~, undoped Si layer 58~~, Aluminum based metallic contacts 60,62,68,70,silicon oxide insulators layer 64,65 Aluminum conductor 66. Layers 52 have a cross section of 4 microns by 2 microns and 200-angstrom thickness.

The operation of device is heuristically suggested in Fig 13. A voltage bias is applied to contact 60 of negative charge relative to contact 62 of positive charge without inserting electrons into layer 52. The potential difference increase the kinetic energy in the n type electron inside layer 52, then electrons wave function expand into silicon layer 54, the expanded electric charge distribution in layer 54 is changed the potential difference between metallic contacts 68,70 said contact are connected in parallel to Aluminum conductor 66 thereby conduction current in Aluminum conductor 66 is changed.

Sixth preferred embodiment is a switching device generally denoted 80 is described in fig.14 and related to the fourth embodiment. Expended wave function influence the conduction on a near by conducting channel. Device 80 is consist of 82 a back source layer , 84 is doped silicon layer with boron atoms, 86 is inversion layer,88 is p type source region, 90 is p-type drain region, layers 88,90 are made of silicon with boron dopants , 92 is silicon oxide insulator , 94 is polysilicon gate, 96,98 are silicon oxide insulator layers,100,102 are Aluminum metal contacts.